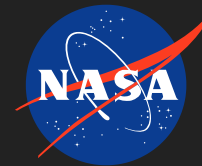


Development of a Cathode Liquid Feed Electrolyzer to Generate 3,600 psi Oxygen for Both Lunar and Space Microgravity Environments, Phase I

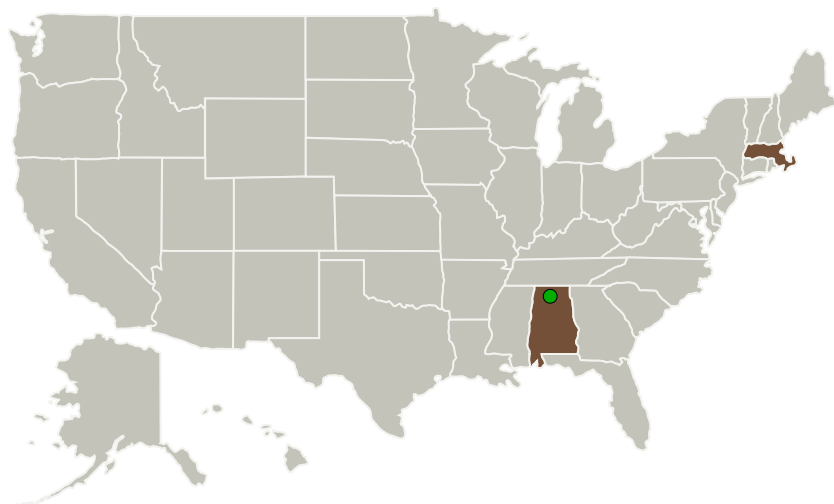
Completed Technology Project (2010 - 2010)



Project Introduction

Giner Electrochemical Systems (GES) proposes to develop a cathode liquid feed, proton-exchange membrane electrolyzer stack and system capable of producing 3,600 psi oxygen. In preparation for this Phase I effort, we propose to collaborate with Hamilton-Sundstrand Human Space Systems (H-S) to share unique state-of-the-art technologies that provide the best path to meeting program objectives. GES will share their data and expertise with high balanced pressure electrolyzers and H-S will contribute their data and expertise in high differential pressure electrolyzers. Based on this exchange, GES would modify its electrolyzer performance model. In a third task, GES will build two single cell electrolyzers with GES and H-S components. One stack will be dedicated to balanced pressure operation, while a second unit would be dedicated to high differential pressure (oxygen over hydrogen) operation. A full experimental matrix will be conducted on these units in a cathode liquid feed configuration. Balanced pressure operation would be conducted at GES facilities (from atmospheric to 2,000 psi). Differential pressure testing would be conducted in H-S facilities (at pressures between 2,000 and 3,600 psi). Data would then be integrated into the GES analysis code, and be available as a design analysis tool for future phases of the program.

Primary U.S. Work Locations and Key Partners



Development of a Cathode Liquid Feed Electrolyzer to Generate 3,600 psi Oxygen for Both Lunar and Space Microgravity Environments, Phase I

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Organizations Performing Work	Role	Type	Location
Giner, Inc.	Lead Organization	Industry	Newton, Massachusetts
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Massachusetts

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140079>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Giner, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

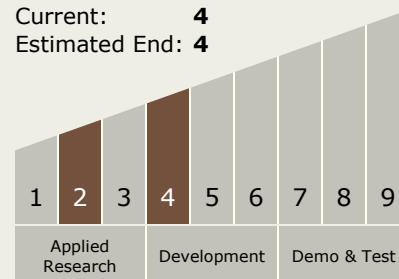
Carlos Torrez

Principal Investigator:

Timothy Norman

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



Development of a Cathode Liquid Feed Electrolyzer to Generate 3,600 psi Oxygen for Both Lunar and Space Microgravity Environments, Phase I

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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.1 Atmosphere Revitalization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System